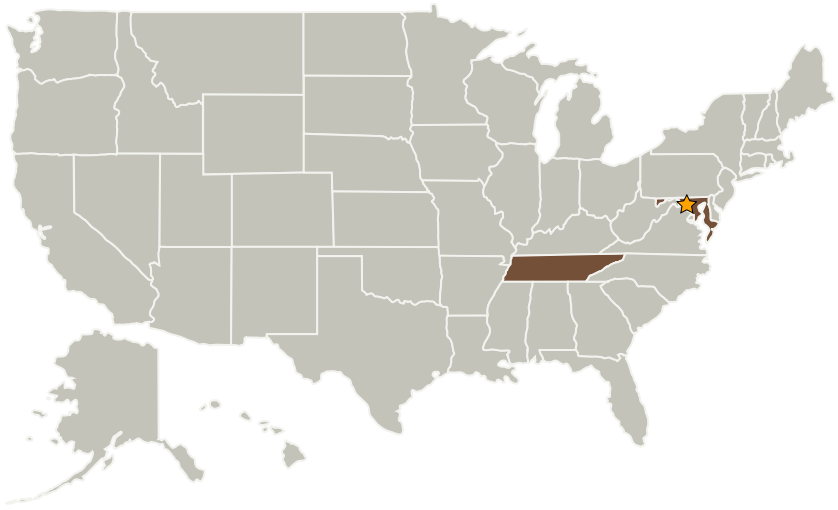
# Hybrid High-Temperature Superconductor Current Leads for Space Applications, Phase II

Completed Technology Project (2009 - 2013)

## Project Introduction

The Tai-Yang Research Company (TYRC) proposes to address the need for high temperature superconducting (HTS) current leads used in an adiabatic demagnetization refrigerator (ADR) for space applications, presently being developed at the NASA / Goddard Space Flight Center (GSFC). The innovation is to use a hybrid of two different HTS conductors bonded together at a thermally and electrically determined optimum point along the length of the current lead. The HTS conductor positioned at the warm end of the current lead will have a higher critical temperature (Tc) than the conductor at the cold end. This hybrid lead uses commercially available 2nd generation HTS conductors optimized for currents less than 10A. The warm end Tc is extended by using a bulk or thin film form not yet commercially available. TYRC will custom-fabricate the higher Tc materials and develop processes for joining them to the lower Tc material. TYRC will develop fabrication processes and generate options for mechanical design of the lead assembly.

## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Goddard Space Flight Center(GSFC) | Lead Organization | NASA Center | Greenbelt, Maryland |
| Tai-Yang Research Corporation | Supporting Organization | Industry | Knoxville, Tennessee |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## Table of Contents



## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Goddard Space Flight Center (GSFC)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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| Primary U.S. Work Locations | |
|---|---|
| Maryland | Tennessee |

## Project Transitions

**December 2009:** Project Start

**December 2013:** Closed out

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.5 Hybrids